

## CLAIMS

I/We Claim:

1. An alternator comprising:

an inner housing;

an outer housing mounted over said inner housing;

a pair of o-rings positioned between said inner housing and said outer

housing thereby creating a sealed flow chamber therebetween;

said flow chamber including a first flow channel, a second flow channel and  
an axial passageway interconnecting said first and second flow channels;

said first flow channel being defined by opposing first and second disk shaped  
portions of said inner housing, such that said first flow channel is a disk shaped  
cavity extending diametrically across said alternator;

said second flow channel being defined by an inner diameter of said outer  
housing and an outer diameter of said inner housing, such that said second flow  
channel forms an annular jacket extending entirely around said alternator;

said axial passageway being defined by an arcuate notch formed within said  
first disk shaped portion of said inner housing such that coolant is directed axially  
from said first flow channel into said second flow channel through said axial  
passageway;

an inlet extending from said first flow channel and adapted to allow coolant to  
enter said first flow channel, said inlet being positioned diametrically across from  
said axial passageway such that coolant entering said inlet must flow diametrically  
across said alternator to reach said axial passageway;

an outlet extending from said second flow channel and adapted to allow  
coolant to exit said flow chamber, said outlet being positioned diametrically across

from said axial passageway such that coolant entering said second flow channel must travel annularly around said alternator to reach said outlet.

2. The electric machine of claim 1 wherein said inlet and said outlet are adapted to connect to a coolant system of an automobile such that engine coolant is circulated through said alternator.

3. The alternator of claim 1 further comprising:

a shaft rotatably supported within said inner housing by a pair of bearing elements, having a pulley mounted to a first end and a pair of slip rings mounted to a second end;

a rotor assembly including first and second pole pieces mounted onto said shaft with an excitation winding mounted between said first and second pole pieces;

a stator assembly fixedly mounted within said inner housing in functional engagement with said rotor assembly.

4. A coolant system for an internal combustion engine for an automobile comprising:

- an engine having flow passages therein adapted to allow coolant to flow through said engine;
- a radiator adapted to cool the coolant flowing therethrough;
- a heater core adapted to receive heated coolant which has passed through the engine and to provide heated air to a passenger compartment of the automobile;
- an alternator having flow passages therein adapted to allow coolant to flow through said alternator, said alternator being positioned up-stream of said heater core such that heat transferred from said alternator to said coolant is utilized by said heater core to provide heated air to a passenger compartment of the automobile.

5. The coolant system of claim 4 wherein said alternator comprises:

- an inner housing and an outer housing mounted over said inner housing;
- a pair of o-rings positioned between said inner housing and said outer housing thereby creating a sealed flow chamber having a first flow channel, a second flow channel and an axial passageway interconnecting said first and second flow channels;
- said first flow channel being defined by opposing first and second disk shaped portions of said inner housing, such that said first flow channel is a disk shaped cavity extending diametrically across said alternator;
- said second flow channel being defined by an inner diameter of said outer housing and an outer diameter of said inner housing, such that said second flow channel forms an annular jacket extending entirely around said alternator;

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said axial passageway being defined by an arcuate notch formed within said first disk shaped portion of said inner housing such that coolant is directed axially from said first flow channel into said second flow channel through said axial passageway;

an inlet extending from said first flow channel and adapted to allow coolant to enter said first flow channel, said inlet being positioned diametrically across from said axial passageway such that coolant entering said inlet must flow diametrically across said alternator to reach said axial passageway;

an outlet extending from said second flow channel and adapted to allow coolant to exit said flow chamber, said outlet being positioned diametrically across from said axial passageway such that coolant entering said second flow channel must travel annularly around said alternator to reach said outlet.

a shaft rotatably supported within said inner housing by a pair of bearing elements, having a pulley mounted to a first end and a pair of slip rings mounted to a second end;

a rotor assembly including first and second poles mounted onto said shaft with an excitation winding mounted between said first and second poles; and

a stator fixedly mounted within said inner housing in functional engagement with said rotor assembly.